

IN THE U.S. PATENT AND TRADEMARK OFFICE

Applicant: Yoshiaki YAMADA et al.

Appl. No.: NEW Group: UNASSIGNED

Filed: October 12, 2001 Examiner: UNASSIGNED

For: OHMIC CONTACT PLUG HAVING  
AN IMPROVED CRACK FREE TiN  
BARRIER METAL IN A CONTACT  
HOLE AND METHOD OF FORMING THE SAME



INFORMATION DISCLOSURE STATEMENT  
(SUBMISSION WITH CONTINUATION-IN-PART OR  
RULE 1.53(b) CONTINUATION OR DIVISIONAL APPLICATION)

Assistant Commissioner for Patents  
Washington, DC 20231

Date: October 12, 2001

Sir:

Pursuant to 37 C.F.R. §§ 1.97 and 1.98, applicant(s) hereby submit(s) an Information Disclosure Statement for consideration by the Examiner.

I. LIST OF PATENTS, PUBLICATIONS OR OTHER INFORMATION

The patents, publications, or other information submitted for consideration by the Office are listed on the PTO-1449 form(s), attached hereto.

II. REFERENCES PREVIOUSLY CITED OR SUBMITTED

Pursuant to 37 C.F.R. § 1.98(d), consideration of information listed on the PTO-1449 form(s) is requested since any patents, publications, or other information which are listed on the PTO-1449 form(s) but for which copies are not enclosed herewith, were previously cited by or submitted to the PTO in one of the following applications which has been relied upon for an earlier filing date under 35 U.S.C. § 120:

U.S. Appl. No(s).

U.S. Filing Date(s)

09/197,682

November 23, 1998

III. FEES

This Information Disclosure Statement is being filed concurrent with the filing of a continuation-in-part, continuation, or divisional patent application; therefore, no fee is required.

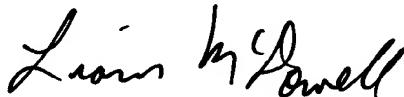
If the Examiner has any questions concerning this IDS or requires a copy of any of the references cited but not provided, he/she is requested to contact the undersigned. If it is determined that this IDS has been filed under the wrong rule, the PTO is requested to consider this IDS under the proper rule (with a petition if necessary) and charge the appropriate fee to Deposit Account No. 25-0120.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 25-0120 for any additional fee required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

YOUNG & THOMPSON

By



Liam McDowell  
Registration No. 44,231  
745 South 23<sup>rd</sup> Street  
Arlington, Virginia 22202  
(703) 521-2297

LM/jrs  
PF-2200DIV

- Enclosures:
- PTO-1449
  - References
  - Foreign Search Report
  - Other:

(Rev. 04/19/2000)

Form PTO-1449

ATTY DOCKET NO.  
PF-2200DIVAPPLICATION NO.  
NEWAPPLICANT  
Yoshiaki YAMADA et al.FILING DATE  
October 12, 2001GROUP  
UNASSIGNED**INFORMATION DISCLOSURE CITATION  
IN AN APPLICATION**

(Use several sheets if necessary)

**U.S. PATENT DOCUMENTS**

EXAMINER INITIAL	DOCUMENT NUMBER	DATE	NAME	CLASS	SUB CLASS	FILING DATE IF APPROPRIATE
	6 0 7 7 7 8 2	2000-06-01	Hsu et al.			
	6 0 5 9 8 7 2	2000-05-01	Ngan et al.			
	6 0 4 6 1 0 0	2000-04-01	Ramaswami et al.			
	5 9 8 5 7 5 6	1999-11-01	Shinmura			

**FOREIGN PATENT DOCUMENTS**

	DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUB CLASS	TRANSLATION	
						YES	NO
	1 9 3 1 1 7	1989-04	JAPAN				
	4 1 9 6 4 8 6	1992-07	JAPAN				
	7 1 6 1 6 6 2	1995-06	JAPAN				
	7 2 4 5 3 0 0	1995-09	JAPAN				
	7 7 8 7 8 9	1995-03	JAPAN				
	8 7 8 5 2 0	1996-03	JAPAN				
	8 1 8 1 2 1 2	1996-07	JAPAN				
	9 2 2 8 0 4 2	1997-09	JAPAN				
	10 6 5 0 0 4	1998-03	JAPAN				
	63 1 1 1 6 6 5	1988-05	JAPAN				

**OTHER DOCUMENTS** (Including Author, Title, Date, Pertinent Pages, etc.)

	J.P. Seidel, et al. "Integrated deposition of TiN barrier layers in cluster tools", Proc. of the SPIE, Vol. 1549, pp. 30-40. (abstract)
	H.J. Barth, et al. "TEM analysis of the spiking mechanism in Al-filled contacts", Advanced Metallization and Interconnect Systems for ULSI Applications in 1996", pp. 305-311. (abstract)
	D.H. Lee, et al. "Characteristics of CMOSFETs with sputter-deposited W/TiN stack gate" 1995 Symp. on VLSI Tech. Digest of tech. Papers, IEEE and JSAP pp. 119-120.
	S.-L. Zhang, et al. "Influence of hydrogen on chemical vapor deposited W on sputter-deposited TiN" Applied Physics Lett., Vol. 67, No. 20, pp. 2998-3000.
	J. van Gogh et al.. "Characterization of improved TiN films by controlled divergence sputtering, pp. 310-313, ISMIC, Vol. 101, No. 92, VMIC Conference, June 9-10, 1992.
	A. Mouroux, et al. "Impact of rapid thermal annealing of Ti-TiN bilayers on subsequent chemical vapor deposition", Advanced Metallization for Future ULSI. Symp., pp. 365-370. (abstract)

EXAMINER

DATE CONSIDERED

EXAMINER: Initial if citation considered, whether or not citation is in conformance with M.P.E.P. 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

LM/jrs